



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

VOL. VI. SAN FRANCISCO, CALIFORNIA, JANUARY 1, 1894. No. 33.

OFFICERS OF THE SOCIETY.

OFFICERS OF THE CHICAGO SECTION.

Executive Committee—RUTHVEN W. PIKE.

OFFICERS OF THE MEXICAN SECTION.

Executive Committee—A. ANGUIANO (Chairman), CAMILO GONZALEZ, FRANCISCO RODRIGUEZ
 REY, AGUSTIN ARAGON.

Mrs. WM. A. ABBÉ	New Bedford, Mass.
Mr. CARL H. ABBOTT	118 11th St., Oakland, Cal.
Prof. W. STEADMAN ALDIS*	{ University College, Auckland, New Zealand.
Mr. A. B. ALEXANDER	404 Post St., S. F., Cal.
Prof. W. D. ALEXANDER	Honolulu, Hawaiian Islands.
Prof. IRA W. ALLEN	612 Maple St., Chicago, Ill.
Dr. JAMES X. ALLEN	365 23d St., Ogden, Utah.
Mr. RICHARD H. ALLEN*	Chatham, Morris Co., N. J.
Mr. ELMER L. ALLOR	Observatory, Ann Arbor, Mich.

* A star signifies Life-Membership. Addresses in italics are not within the Postal Union. Total membership, 481 (59 life-members).

Publications of the

Mr. CHARLES ALTSCHUL	{ London, Paris and American Bank, S. F., Cal.
Hon. HENRY B. ALVORD*	San José, Cal.
Hon. WILLIAM ALVORD*	2200 Broadway, S. F., Cal.
Mrs. WILLIAM ALVORD*	2200 Broadway, S. F., Cal.
Mr. W. S. ANDREWS	Lancaster, Pa.
Director ANGEL ANGUIANO	{ National Observatory, Tacubaya, Mexico.
Mr. AGUSTIN ARAGÓN	{ Puerta falsa de la Merced No. 3, City of Mexico, Mexico.
Mr. F. S. ARCHENHOLD	{ Observatorium, Grunewald, bei Berlin, Germany.
Mrs. H. R. ARNDT	San Diego, Cal.
Mr. J. LAWRENCE ASPINWALL	71 Broadway, New York, N. Y.
Mr. J. J. AUBERTIN*	{ 33 Duke Street, St. James, S. W., London, England.
Dr. HARRIET AUCUTT	726 23d St., Ogden, Utah.
Mr. ROBERT STANTON AVERY	320 A St., Washington, D. C.
Mr. ALLEN H. BABCOCK	{ Care General Electric Co., 15 First St., S. F., Cal.
Mr. T. W. BACKHOUSE	{ West Hendon House, Sunderland, England.
Mr. N. A. BALDWIN	New Haven, Conn.
Mr. T. R. BANNERMAN	2407 Howard St., S. F., Cal.
Miss M. M. BARKSDALE	{ St. Rose's Academy, Golden Gate Avenue and Steiner Street, S. F., Cal.
Dr. G. BARROETA	San Luis Potosi, Mexico.
Mr. J. BASSETT	{ 82 High St., Stoke Newington, N., England.
Miss FRANCES L. BEANS	489 N. First St., San José, Cal.
Mrs. T. ELLARD BEANS	489 N. First St., San José, Cal.
Hon. JOHN L. BEARD	{ Warm Springs, Alameda Co., Cal.
Mr. GEORGE W. BEAVER	1300 Taylor St., S. F., Cal.
Mr. A. C. BEHR	16 Union Place, Chicago, Ill.
Mr. WM. C. BELCHER	{ 520 Montgomery Street, S. F. Cal.
Mr. HENRY BERGER	{ Observatory Hill, Allegheny, Pa.
Mr. EDWIN BERGH	{ 357½ N. Main St., Los Angeles, Cal.
Prof. FRANK H. BIGELOW	{ U. S. Weather Bureau, Washington, D. C.
Mr. R. L. BISCHOFFSHEIM*	3 Rue Taitbout, Paris, France.
Mr. ANSON STILES BLAKE	Berkeley, Cal.
Mr. CHARLES T. BLAKE	Berkeley, Cal.
Hon. JOHN H. BOALT	332 Haight St., S. F., Cal.
Mr. HENRY LORD BOULTON, JR.*	{ Carácas, Venezuela, or Box 2015, New York City.
Mr. J. A. BRASHEAR	Allegheny City, Pa.

Rev. M. S. BRENNAN	{ St. Lawrence's Church, St. Louis, Mo.
Rev. A. L. BREWER	San Mateo, Cal.
Mr. EDWARD M. BREWER	27 Kilby Street, Boston, Mass.
Mr. JOSEPH BROOKS	{ Hope Bank, Nelson St., Wool- lahra, via Sydney, New South Wales.
Miss E. BROWN*	{ Further Barton, Cirencester, England.
Dr. WILLIAM ANDREWS BROWNE, . . .	Newton, Mass.
Mr. J. L. BROWNELL	Nyack, New York.
Dr. J. D. BROWNLEE	754 S. 3d St., San José, Cal.
Miss C. W. BRUCE*	39 E. 23d St., New York City.
Mr. CHARLES BURCKHALTER, F.R.A.S. .	{ CHABOT Observatory, Oak- land, Cal.
Mr. D. H. BURNHAM	Rookery Building, Chicago, Ill.
Miss HARRIETTA C. BUTLER	3214 Washington St., S. F., Cal.
Miss MARY E. BYRD	{ The Observatory, Smith Col- lege, Northampton, Mass.
Dr. J. CALLANDREAU*	{ 328-330 Montgomery St., S. F., Cal.
Prof. W. W. CAMPBELL	{ LICK Observatory, Mt. Hamil- ton, Cal.
Mr. H. P. CARLTON	716 19th St., Oakland, Cal.
Mr. ANDREW CARNEGIE*	5 West 51st St., New York City.
Mr. O. E. CARTWRIGHT	{ 165 Elmwood Ave., Detroit, Mich.
Mr. CLARENCE CARY	{ 59 Wall St., New York City, N. Y.
Mr. F. J. CASTELHUN	320 Sansome St., S. F., Cal.
Mr. J. C. CEBRIAN*	{ Pine and Octavia Sts., S. F., Cal.
Mrs. EMELIE M. CHABOT	{ Cor. 11th and Madison Sts., Oakland, Cal.
Miss JOSIE CHABOT	{ Cor. 11th and Madison Sts., Oakland, Cal.
Mr. FREDERICK H. CHAPIN	Hartford, Conn.
Mr. E. K. CHAPMAN	315 Montgomery St., S. F., Cal.
Mrs. JOHN JAY CHAPMAN	{ 327 W. 82d St., New York, N. Y.
Rev. C. M. CHARROPPIN, S. J.	{ St. Xavier College, Cincinnati, Ohio.
Mr. ISAAC Y. CHUBBUCK	Roxbury, Mass.
Rev. E. BENTLEY CHURCH	1036 Valencia St., S. F., Cal.
Mr. B. G. CLAPP	The Academy, Fulton, N. Y.
Dr. E. S. CLARK	16 Geary St., S. F., Cal.
Miss ISABELLA D. CLARK	San José, Cal.
Mr. MATEO CLARK*	{ 27 Queen's Gate, London, England.
Miss AGNES M. CLERKE	{ 68 Redcliffe Square, London, England.
Mr. ERNEST A. CLEVELAND	Vancouver, B. C.

Publications of the

Mr. C. H. COCHRANE	{ 18 Astor Place, New York, N. Y.
Mr. ARTHUR COLLINS	Swarthmore, Delaware Co., Pa.
Mr. A. L. COLTON*	{ Lick Observatory, Mt. Hamil- ton, Cal.
Mr. ALEXANDER K. CONEY	604 Clay Street, S. F., Cal.
THE COSMOS CLUB	Washington, D. C.
Mr. J. COSTA	{ 328-330 Montgomery St., S. F., Cal.
Mr. HENRY COWELL*	413 Hyde Street, S. F., Cal.
Mr. CHARLES A. CRACKBON	300 Scott St., S. F., Cal.
Mr. A. W. CRAIG	177 8th St., Oakland, Cal.
Mr. HOMER A. CRAIG	1325 Alice St., Oakland, Cal.
Mr. WALTER CRAMP	{ 1229 North Broad St., Phila- delphia, Pa.
HON. C. F. CROCKER*	{ Leavenworth and Pine Sts., S. F., Cal.
Miss S. J. CUNNINGHAM	{ Swarthmore College, Dela- ware Co., Pa.
Mr. CHAS. S. CUSHING	1669 13th St., Oakland, Cal.
Mr. J. EWEN DAVIDSON*	{ Alexandra Plantation, Brans- combe, Mackay, Queensland.
Mr. ISAAC H. DAVIS	Dorchester, Mass.
Mr. JOSEPH E. DAVIS	{ 154 Beacon Street, Boston, Mass.
Mr. C. W. DEARBORN	{ Care Oakland Bank of Savings, Oakland, Cal.
Dr. J. H. DE MERITT	{ 1335 Vermont Ave., Washing- ton, D. C.
Mr. A. B. DEPUY	{ 541 Washington St., Camden, N. J.
Mrs. JOHN H. DEVEREUX	{ 869 Euclid Ave., Cleveland, Ohio.
Mr. W. H. DEVINE	Nagasaki, Japan.
Mr. FR. DIENELT	Loda, Iroquois Co., Illinois.
Mr. F. W. DOHRMANN	Alameda, Cal.
Mr. JOHN DOLBEER	10 California St., S. F., Cal.
Mrs. MERVYN DONAHUE	{ 799 Van Ness Avenue, S. F., Cal.
HON. JOSEPH A. DONOHUE*	Menlo Park, Cal.
Mr. W. E. DOWNS	Sutter Creek, Amador Co., Cal.
Prof. MELVILLE DOZIER	{ State Normal School, Los An- geles, Cal.
Mrs. ANNA PALMER DRAPER*	{ 271 Madison Ave., New York, N. Y.
Dr. L. L. DUNBAR	500 Sutter St., S. F., Cal.
Miss DUNHAM	37 E. 36th St., New York, N. Y.
Mr. FRANCIS G. DU PONT	Wilmington, Del.
Mrs. HERBERT DU PUY	{ 190 Western Ave., Allegheny, Pa.
HON. J. DIAZ DURAN	204 Front St., S. F., Cal.
Mr. HARRY DURBROW	322 California St., S. F., Cal.

Mr. EARNEST I. DYER	{ University of California, Berkeley, Cal.
Mr. JOSEPH G. EASTLAND . . . . .	. 920 Pine St., S. F., Cal.
Mr. CHARLES R. EASTMAN	{ Care Alvan Clark, 186 Brookline St., Cambridge, Mass.
Mrs. CHARLES R. EASTMAN	{ Care Alvan Clark, 186 Brookline St., Cambridge, Mass.
Mr. ALFRED L. EDWARDS . . . . .	. 12 W. 33d St., New York, N. Y.
Prof. GEO. C. EDWARDS . . . . .	. Berkeley, Cal.
Mr. W. S. EICHELBERGER	{ Wesleyan University, Middletown, Conn.
Capt. OLIVER ELDRIDGE . . . . .	. 615 Sutter St., S. F. Cal.
Mr. THOMAS GWYN ELGER	{ Beaumont House, Shakespeare Road, Bedford, England.
Mr. FERD. ELLERMAN	{ KENWOOD Observatory, 4545 Drexel Boulevard, Chicago, Ill.
Mr. R. L. J. ELLERY	{ Govt. Astronomer, Observat'y, Melbourne, Victoria.
Hon. JAMES G. FAIR* . . . . .	. 230 Montgomery St., S. F., Cal.
Mr. FRANKLIN FAIRBANKS . . . . .	. St. Johnsbury, Vermont.
Mr. H. W. FAUST . . . . .	. 618 Harrison St., S. F., Cal.
Mr. W. B. FEATHERSTONE . . . . .	. 1230 24th St., S. F., Cal.
Mr. F. H. FERRINGTON	{ 36 Albert St., Shrewsbury, England.
Mr. ROBERT ISAAC FINNEMORE,* F. R. A. S.	<i>Durban, Natal, South Africa.</i>
Mr. S. WILSON FISHER . . . . .	. 1502 Pine St., Philadelphia, Pa.
Mr. ANDREW B. FORBES* . . . . .	. 401 California St., S. F., Cal.
Mr. GEO. STUART FORBES . . . . .	. Madras, India.
Mr. ARTHUR W. FOSTER* . . . . .	. 322 Pine St., S. F., Cal.
Mr. H. C. FRICK* . . . . .	. 42 5th Ave., Pittsburg, Pa.
Prof. CHAS. W. FRIEND . . . . .	. Observatory, Carson, Nev.
Mr. ROBERT D. FRY* . . . . .	. 1812 Jackson St., S. F., Cal.
Dr. C. G. FULLER	{ 39 Central Music Hall, Chicago, Ill.
Hon. LEVI K. FULLER . . . . .	. Brattleboro', Vermont.
Hon. W. H. GALBRAITH . . . . .	. Santa Cruz, Cal.
Mr. WALTER F. GALE, F. R. A. S. . . . .	. Paddington, Sydney, N. S. W.
Mr. JOHN GAMBLE . . . . .	. Haywards, Cal.
Mr. JOS. F. GASSMANN . . . . .	. 318 Montgomery St., S. F., Cal.
Mr. OTTO VON GELDERN	{ Room 56, 819 Market St., S. F., Cal.
Mr. LOUIS GEX . . . . .	. Santos, Brazil.
Mr. J. J. GILBERT . . . . .	. Olympia, Washington.
Dr. DAVID GILL	{ <i>Royal Astronomer, Cape of Good Hope, Africa.</i>
Mr. ALLEN F. GILLIHAN . . . . .	. 135 Pandora St., Victoria, B. C.
Mr. L. GILSON . . . . .	. 211 Sansome St., S. F., Cal.
Mr. GEORGE GLEASON	{ South Pasadena. Los Angeles Co., Cal.
Mr. CAMILO GONZALES	{ National Observatory, Tacubaya, Mexico.

S. D. JOSÉ GONZALEZ	{ Observatory, Bogota, U. S. of Columbia, South America.
Capt. CHARLES GOODALL*	{ S.E. cor. McAllister and Pierce Sts., S. F., Cal.
Mr. ADAM GRANT*	{ N. E. cor. Bush and Sansome Sts., S. F., Cal.
Mr. JOSEPH D. GRANT*	{ N. E. cor. Bush and Sansome Sts., S. F., Cal.
Rev. CHARLES GRAVES	{ People's Church, Anamosa, Iowa.
Prof. D. GRAWE	{ Observatory, University of St. Petersburg, St. Petersburg, Russia.
Mr. T. P. GRAY	{ The Lodge, Clapham Road, Bedford, England.
Mr. ANDREW GREIG* . . . . .	. Belle Vue, Tayport, Scotland.
Sir GEORGE GREY, K. C. B* . . . . .	. Auckland, New Zealand.
Mr. C. P. GRIMWOOD . . . . .	. P. O. Box 2092, S. F., Cal.
Mr. ALVA J. GROVER . . . . .	. 1137 Park Ave., Omaha, Neb.
Rev. H. GRATTAN GUINNESS, D. D.	{ Cliff House, Curbar, via Shef- field, England.
Miss ESTELLA L. GUPPY . . . . .	. San José, Cal.
Mr. W. C. GURLEY . . . . .	. Marietta, Ohio.
Mr. E. F. HAAS . . . . .	. Berkeley, Cal.
Miss ELSIE HADLEY	{ State Normal School, Valley City, North Dakota.
Mr. G. E. HALE	{ 4545 Drexel Boulevard, Chica- go, Ill.
Miss JOSEPHINE HARKER	{ 3214 Washington St., S. F., Cal.
Dr. H. W. HARKNESS	{ California Academy of Sci- ences, S. F., Cal.
Mr. WM. STURTEVANT HARLOW . . . . .	. Oakland, Cal.
Mr. ORRIN E. HARMON . . . . .	. Chehalis, Lewis Co., Wash.
Mr. HENRY HARRISON	{ Maudeville Ave., Jersey City Heights, New Jersey.
Mr. H. BARRYMORE HARRISON	{ Persian Gulf Telegraph, Kara- chi, via Bombay, India.
Mr. CHARLES F. HART	{ The Oaks, North Temescal, Alameda Co., Cal.
Prof. JAMES NORRIS HART . . . . .	. Maine State College, Orono, Me
Prof. MELLE W. HASKELL	{ University of California, Berke- ley, Cal.
Mr. O. C. HASTINGS . . . . .	. Box 166, Victoria, B. C.
Mr. F. H. HAUSMAN . . . . .	. P. O. Box 2468, S. F., Cal.
Rev. HENRY C. HAWTREV	{ Greycliff, Bonchurch, Isle of Wight, England.
Mrs. PHEBE HEARST . . . . .	. California Hotel, S. F., Cal.
Mrs. A. G. HEATON	{ 1330 Nineteenth St., Washing- ton, D. C.
Mr. ANDREW P. HENKEL	{ 317 Locust St., Walnut Hills, Cincinnati, O.
Mr. H. S. HERRICK . . . . .	. 13 Nevada Block, S. F., Cal.
Mr. DAVID HEWES . . . . .	. Occidental Hotel, S. F., Cal.

Mr. GEO. W. HEWITT	Burlington, New Jersey.
Prof. ALFRED HIGBIE	{ S.W. cor. Pierce and Pine Sts., S. F., Cal.
Hon. HENRY E. HIGHTON	528 California St., S. F., Cal.
Hon. S. G. HILBORN	Mills Building, S. F., Cal.
Mr. CHAS. B. HILL	212 Pine St., S. F., Cal.
Mr. HORACE L. HILL*	314 California St., S. F. Cal.
Dr. A. C. HIRST	{ Simpson Memorial Church, S. F., Cal.
Rev. H. O. HOFFMAN	Bloomington, Ill.
Mr. SAMUEL V. HOFFMAN*	{ JOHNS HOPKINS University, Baltimore, Md.
Mr. CHARLES W. HOLDEN	30 Congress St., Boston, Mass.
Prof. EDWARD S. HOLDEN	{ LICK Observatory, Mt. Hamil- ton, Cal.
Mr. S. E. HOLDEN	Napa, Cal.
Mr. L. J. HOLTON	1207 Grand St., Alameda, Cal.
Mr. MAURES HORNER	{ 12 St. Helen's Place, Bishops- gate St., London, England.
Prof. G. W. HOUGH	{ DEARBORN Observat'y, Evans- ton, Ill.
Hon. JAMES F. HOUGHTON	303 California St., S. F., Cal.
Hon. C. WEBB HOWARD*	Pacific Union Club, S. F., Cal.
Mr. WM. HOWAT	{ 358 William St., Melbourne, Victoria.
Prof. C. H. HOWIESON	Chippewa Falls, Wis.
Mr. HENRY S. HULBERT	Probate Court, Detroit, Mich.
Prof. ALEX. S. HUNTER	Hanover, Indiana.
Prof. W. J. HUSSEY	{ Stanford Jr. University, Palo Alto, Cal.
Mrs. M. H. HUTTON	{ 26 Union St., New Brunswick, New Jersey.
IMPERIAL OBSERVATORY	{ University of St. Petersburg, Russia.
Mr. JAMES E. INGRAHAM	{ Gen'l Ag't J. St. A. & I. R. R. Co., St. Augustine, Florida.
Mr. C. W. IRISH	{ 1231 New York Avenue, N. W. Washington, D. C.
Mr. HERMANN IWERSEN	{ Consul for Sweden and Nor- way, Nagasaki, Japan.
Mr. W. H. IZZARD	{ 20 Boston Park Road, Brent- ford, W., England.
Mr. CHARLES H. JACKSON	716 Sutter St., S. F., Cal.
Mr. FRANK JAYNES	{ W. U. Telegraph Co., S. F., Cal.
Mr. NELS JOHNSON	Manistee, Mich.
Mr. PAUL TYCHO JOHNSON	Livermore, Alameda Co., Cal.
Mr. T. C. JOHNSTON	1019 Post St., S. F., Cal.
Prof. C. N. JONES	{ Care New York Life Ins. Co., 346 Broadway, New York.
Mr. E. B. JORDAN	309 Sansome St., S. F., Cal.
Hon. W. H. JORDAN	328 Montgomery St., S.F., Cal.

Mr. CHRISTIE C. KANAGA	Box 158, Ogden, Utah.
Prof. J. E. KEELER	{ The Observatory, Allegheny City, Pa.
Prof. JOSIAH KEEP	{ Mills College, Alameda Co., Cal.
Mr. A. KEITH	Riverside, Cal.
Mr. W. E. KEITH	Riverside, Cal.
Mr. A. E. KENNELLY	Edison Laborat'y, Orange, N.J.
Prof. JEFFERSON E. KERSCHNER . . .	{ DANIEL SCHOLL Observatory, Lancaster, Pa.
Mr. RODNEY G. KIMBALL	253 Monroe St., Brooklyn, N. Y.
Miss LAURA KIMBER	Hotel Richelieu, S. F., Cal.
Mr. DONALD KING	{ 8 Church Lane, Hornsey, Lon- don, England.
Prof. D. KIRKWOOD, LL. D.	{ Arlington Avenue, Riverside, Cal.
Mr. SYDNEY T. KLEIN*	{ Observatory, Great Stanmore, Middlesex, England.
Miss DOROTHEA KLUMPKE	{ National Observatory, Paris, France.
Mr. WM. H. KNIGHT	{ 747 College St., Los Angeles, Cal.
Mr. EDWARD B. KNOBEL	{ 3 Tavistock Square, London, W. C., England.
Mr. AUGUSTUS F. KNUDSEN	Honolulu, Hawaiian Islands.
Mr. TORVALD KÖHL*	Odder, Denmark.
Mr. FR. KOEPPEN	{ Potsdamer St. 65, Berlin, Ger- many.
Mr. EDWARD LANDE	Mills Building, S. F.
Dr. S. P. LANGLEY	{ Director Smithsonian Institu- tion, Washington, D. C.
Miss LASSELL	{ Winkton Lodge, near Ring- wood, Hants, England.
Mr. JOSEPH G. LAVERY	219 Sansome St., S. F., Cal.
Mr. WALTER W. LAW	Yonkers, N. Y.
Miss HANNAH TOWNSEND LAWRENCE .	{ Bayside, Long Island, New York.
Mr. JAMES LAWRENCE	Groton, Mass.
Prof. ANDREW COWPER LAWSON . . .	Berkeley, Cal.
Hon. MANUEL FERNANDEZ LEAL . . .	{ Calle de Cordovanes No. 3, City of Mexico, Mexico.
Prof. F. P. LEAVENWORTH	{ University of Minnesota, Min- neapolis, Minn.
Prof. JOSEPH LeCONTE, LL. D.	Berkeley, Cal.
Rev. EDMUND LEDGER, M.A., F.R.A.S.	Claydon, Ipswich, England.
Dr. L. L. LEGGETT	{ Masonic Temple, Cleveland, Ohio.
Miss MARGARET LEPPER	Box 490, Benicia, Cal.
Mr. A. O. LEUSCHNER	{ University of California, Berke- ley, Cal.
Mr. CLARENCE MACKENZIE LEWIS . .	{ 104 E. 37th St., New York, N. Y.
Mr. J. B. LEWIS, C. E.	126 Sparks St., Ottawa, Canada,

Mr. JOHN E. LEWIS	Ansonia, Conn.
Dr. W. B. LEWITT	{ Hayes and Laguna Sts., S. F., Cal.
THE CITY LIBRARY	Lowell, Mass.
THE NEWBERRY LIBRARY	Chicago, Ill.
Mr. ADOLPH LIETZ	422 Sacramento St., S. F., Cal.
Mr. J. A. LIGHTHIPE	15 First St., S. F., Cal.
Mr. JOHN D. LOCKE	Haverhill, New Hampshire.
Mr. HENRY B. LOOMIS	Seattle, Washington.
Mr. CHARLES A. LOXTON	Walsall, Staffordshire, England
Prof. GUSTAV C. LUEBEN	San Rafael, Marin Co., Cal.
Mr. FRANK E. LUNT	{ Care R. G. Lunt, Los Angeles, Cal.
Rev. ROBERT MACKENZIE, D. D. . . .	San Francisco, Cal.
Mr. DAVID MAHANY	{ 13 East 55th St., New York City.
Mr. MARSDEN MANSON, C. E.	88 Flood Building, S. F., Cal.
Mr. F. MARTENS	{ College Point, Queen's Co., New York.
Mr. CAMILO MARTIN	411½ California St., S. F., Cal.
Hon. E. S. MARTIN	P. O. Box 75, Wilmington, N.C.
Hon. E. B. MASTICK	{ Office of the Lick Trust, S. F., Cal.
Mr. CHARLES MATSON	{ Box 30, Edison, Skagit County, Washington.
Mr. W. H. MAW*	{ 18 Addison Road, Kensington, London, England.
Mr. FRANK McCLEAN,* M.A., F.R.A.S.	{ Rusthall House, Tunbridge Wells, England.
Mr. JAMES JENNINGS McCOMB	{ 175 W. 58th St., New York City.
Mr. F. H. McCONNELL	19 Montgomery St., S. F., Cal.
Mr. JOHN McDONOUGH	193 28th St., Brooklyn, N.Y.
Mr. PETER McEWEN	819 Market St., S. F., Cal.
Prof. MALCOLM McNEILL	Lake Forest, Ill.
Mr. J. MESSER	{ Care of Carl Ricker, Nevsky Prospect No. 14, St. Peters- burg, Russia.
Prof. A. A. MICHELSON	{ University of Chicago, Chicago, Ill.
Hon. ALBERT MILLER*	532 California St., S. F., Cal.
Mr. DAVID MILLER	{ Lands Department, Sydney, New South Wales.
Prof. E. MILLER	{ University of Kansas, Law- rence, Kansas.
Mr. MILO H. MILLER	{ McKeesport, Allegheny Co., Pa.
Hon. D. O. MILLS*	15 Broad St., New York City.
Mr. EDGAR MILLS	{ Briceland House, Menlo Park, Cal.
Judge F. W. MINER	Providence, R. I.
Mr. E. J. MOLERA,* C. E.	40 California St., S. F., Cal.

Publications of the

Mr. JOSÉ ORTIZ MONASTERIO	{ Instituto Mexico, Esquina Plateros y Empedradillo, City of Mexico, Mexico.
Mr. W. H. S. MONCK	{ 16 Earlsfort Terrace, Dublin, Ireland.
Mrs. ALEXANDER MONTGOMERY*	{ Leavenworth and Vallejo Sts., S. F., Cal.
Mr. BEVERLY K. MOORE . . . . .	. 56 Bedford St., Boston, Mass.
Mr. JAMES MOORE . . . . .	. 310 California St., S. F., Cal.
Mr. C. MOORMAN . . . . .	. What Cheer, Keokuk Co., Iowa
Prof. IRA MORE	{ Normal School, Los Angeles, Cal.
Mr. R. S. MORRISON . . . . .	. Equitable Bld'g, Denver, Col.
Mr. FREMONT MORSE, U.S.C. & G. Survey . . . . .	. P. O. Box 2512, S. F., Cal.
Mr. WILLIAM S. MOSES	{ Turk St., bet. Masonic and Parker Aves., S. F., Cal.
Mr. C. A. MURDOCK . . . . .	. 2710 Scott St., S. F., Cal.
Hon. B. D. MURPHY* . . . . .	. San José, Cal.
Mr. H. F. NEWALL,* F. R. A. S.	{ Observatory of the University, Cambridge, England.
Mr. C. J. NICKERSON . . . . .	. St. Helena, Napa Co., Cal.
Mr. G. W. NICOLLS . . . . .	. Caixa 776, Riode Janeiro, Brazil
Mr. P. NOORDHOFF . . . . .	. Groeningen, Holland.
Mr. CHARLES NORDHOFF . . . . .	. Coronado, Cal.
Hon. WILLIAM NORRIS . . . . .	. 927 Bush St., S. F., Cal.
Miss ROSE O'HALLORAN . . . . .	. 2023 Pine St., S. F., Cal.
Mr. WARREN OLNEY	{ 481 Prospect Ave., Oakland, Cal.
Miss M. A. ORR . . . . .	. Beverley, Armidale, N. S. W.
Mr. F. S. OSBORNE . . . . .	. Montauk Block, Chicago, Ill.
Mr. M. M. O'SHAUGHNESSY . . . . .	. 2010 Eddy St., S. F., Cal.
OXFORD COLLEGE . . . . .	. Oxford, Ohio.
Mr. T. S. PALMER	{ Department of Agriculture, Washington, D. C.
Dr. GEORGE C. PARDEE . . . . .	. 526 Montgomery St., S. F., Cal.
Mr. JAMES L. PARK . . . . .	. Braddock, Pa.
Mr. H. E. PARKER	{ 57 Railroad Ave. E., E. Bridgeport, Conn.
Mr. M. M. PARKER . . . . .	. San José, Cal.
Mr. JOHN A. PARKHURST . . . . .	. Marengo, McHenry Co., Ill.
Mr. JOHN PARTRIDGE . . . . .	. 214 California St., S. F., Cal.
Dr. S. C. PASSAVANT . . . . .	. Powers Hotel, Rochester, N. Y.
Mr. JOHN PATTEN	{ Harford Ave. and Forrest St., Baltimore, Md.
Miss ELIZABETH H. PEARSON	{ 219 Savin Hill Ave., Boston, Mass.
Miss CLARA A. PEASE . . . . .	. High School, Hartford, Conn.
Miss PENDLETON	{ 1522 Locust St., Philadelphia, Pa.
Hon. GEO. C. PERKINS* . . . . .	. Oakland, Cal.
Prof. H. B. PERKINS . . . . .	. Box 240, Pasadena, Cal.

Mr. C. D. PERRINE	{ Lick Observatory, Mt. Hamilton, Cal.
Mr. JOHN PERRY, JR. . . . .	. Occidental Hotel, S. F., Cal.
Hon. T. GUY PHELPS . . . . .	. Belmont, Cal.
Mr. HENRY PHIPPS, JR.*	{ Carnegie, Phipps & Co., Pittsburgh, Pa.
Mr. SAM C. PHIPPS . . . . .	. Milbrae, Cal.
Mr. ARCHIE B. PIERCE	{ University of California, Berkeley, Cal.
Mr. JOHN JAV PIERREPONT	{ 1 Pierrepont Place, Brooklyn, Kings Co., N. Y.
Mr. LAWRENCE H. PIERSON . . . .	. Pacific P. L. Co., S. F., Cal.
Hon. WM. M. PIERSON, F. R. A. S. .	{ 4th floor, Mills Building, S. F., Cal.
Mr. O. A. L. PIHL . . . . .	. Christiania, Norway.
Mr. RUTHVEN W. PIKE* . . . . .	. 166 La Salle St., Chicago, Ill.
Mr. CHARLES LANE POOR	{ Johns Hopkins University, Baltimore, Md.
Dr. THOMAS PORTER . . . . .	. Lauriston, Ballarat, Australia.
Mr. CHARLES A. POST . . . . .	. Bayport, Long Island, N. Y.
Mr. WM. APPLETON POTTER	{ 39 W. 27th Street, New York, N. Y.
Mr. THOMAS PRATHER	{ President Union National Bank, Oakland, Cal.
Mr. MANUEL G. PRIETO . . . . .	. Tacubaya, Mexico.
Mr. C. PUDDEFOOT	{ Champlain and Brush Sts., Detroit, Mich.
Mr. GUILLERMO PUGA	{ National Observatory, Tacubaya, Mexico.
Miss GRACE RAND . . . . .	. Lombard, Illinois.
Mr. F. B. RANDALL, U. S. R. M. . .	{ U. S. Rev. Str. "Corwin," S. F., Cal.
Mr. A. COWPER RANYARD*	{ 11 Stone Buildings, Lincoln's Inn, London, England.
Sister ANNA RAPHAEL	{ College of Notre Dame, San José, Cal.
Mr. ALBERT RAYMOND	{ Room 96, Chronicle Building, S. F., Cal.
Mr. NORMAN B. REAM . . . . .	. 1901 Prairie Ave., Chicago, Ill.
Hon. J. B. REDDICK	{ San Andreas, Calaveras Co., Cal.
Mr. ALFRED P. REDINGTON	{ Second and Stevenson Sts., S. F., Cal.
Prof. J. K. REES	{ Observatory of Columbia College, New York City.
Mr. EDWARD B. REILLEY	{ 1812 Christian St., Philadelphia, Pa.
Mr. M. REIMAN	{ 4325 Drexel Boulevard, Chicago, Ill.
Mr. FRANCISCO RODRIGUEZ REY . .	{ National Observatory, Tacubaya, Mexico.
Mr. V. J. A. REY . . . . .	. 829 Union St., S. F., Cal.
Rev. J. L. RICARD, S. J. . . . .	. Santa Clara, Cal.

Publications of the

Mrs. W. G. RICE	13 Elk St., Albany, N. Y.
Mr. FRANKLIN SIDNEY RISING	120 Sutter St., S. F., Cal.
Mr. ALLAN D. RISTEEN	{ 701 Asylum Ave., Hartford, Conn.
Mr. G. W. RITCHEY	{ 5916 Wright St., Englewood, Ill.
Mr. ISAAC ROBERTS, F. R. A. S.	Crowboro, Sussex, England.
Mr. N. A. ROBINSON	{ Room 1, 430 Kearny St., S. F., Cal.
Mr. T. A. ROBINSON	320 Post St., S. F., Cal.
Hon. ARTHUR RODGERS	Nevada Block, S. F., Cal.
Mr. F. B. RODOLPH	{ 969 Washington St., Oakland, Cal.
Dr. W. H. ROLLINS	250 Marlboro St., Boston, Mass.
Mrs. G. J. ROOTE	Mansfield, Wright Co., Mo.
Mr. A. W. ROSE, JR.	224 California St., S. F., Cal.
Mr. GEO. A. ROSS	1144 21st St., S. F., Cal.
THE EARL OF ROSSE	{ Birr Castle, Parsonstown, Ire- land.
Baron ALBERT VON ROTHSCHILD*	Vienna, Austria.
Mr. JOHN R. RUCKSTELL	{ Room 79, Donohoe Building, S. F., Cal.
Rev. E. H. RUDD, D. D.	{ St. Mary's School, Knoxville, Ill.
Mr. G. N. SAEGMULLER	{ Care Fauth & Co., Maryland Ave., Washington, D. C.
Mr. JOSEPH C. SALA	429 Montgomery St., S. F., Cal.
Prof. J. M. SCHAEBERLE*	{ LICK Observatory, Mt. Hamil- ton, Cal.
Mr. HERMAN SCHUSSLER	Pacific Union Club, S. F., Cal.
Mr. HENRY T. SCOTT	Box 2128, S. F., Cal.
Hon. IRVING M. SCOTT	507 Harrison St., S. F., Cal.
Mr. JAMES L. SCOTT	{ Care Turnbull, Howie & Co., Shanghai, China.
Rev. GEORGE M. SEARLE	{ Catholic University of America, Brookland, D. C.
Mr. FRED. H. SEARES	Berkeley, Cal.
Mr. T. J. J. SEE	{ University of Chicago, Chica- go, Ill.
Dr. J. M. SELFRIDGE	Box 37, Oakland, Cal.
Mr. RICHARD PICKERING SELLORS	{ Government Observatory, Syd- ney, New South Wales.
Mr. EDWARD, PERRONET SELLS	{ The Observatory, Adelaide, South Australia.
Mr. GARRETT P. SERVISS	8 Middagh St., Brooklyn, N. Y.
Mrs. ELLA M. SEXTON	113 Sullivan St., S. F., Cal.
Prof. A. SHDANOW	{ Observatory, University of St. Petersburg, St. Petersburg, Russia.
Dr. T. STEELE SHELDON, F. R. A. S.	Parkside, Macclesfield, England
Hon. ROBERT SHERWOOD	303 California St., S. F., Cal.
Judge CHARLES W. SLACK	1729 Sutter St., S. F., Cal.

Mr. CHARLES SLEEPER	211 Sansome St., S. F., Cal.
Mr. CHAS. S. SMITH*	25 W. 47th St., New York, N. Y.
Mr. H. STEPHENSON SMITH	428 California St., S. F., Cal.
Mr. WM. F. SMITH	2426 Pine St., S. F., Cal.
Mr. ROGER SPRAGUE	{ University Park, Arapahoe Co., Colorado.
Mr. C. A. SPRECKELS	San Mateo, Cal.
Mrs. C. A. SPRECKELS	San Mateo, Cal.
Mr. RUDOLPH SPRECKELS	Palace Hotel, S. F., Cal.
Miss GERTRUDE STANFORD	1218 Oak St., Oakland, Cal.
Dr. HEZEKIAH STARR	{ 218 N. Liberty St., Baltimore, Md.
Mr. J. F. STEWARD	1135 Dunning St., Chicago, Ill.
Mr. ALLAN STOCKTON	{ Bethayres, Montgomery Co., Pa.
Mr. F. G. STOKES, B. A.	{ Care Rev. H. C. Hawtrey, St. Mark's School, Windsor, Berks, England.
Rev. GEORGE STOKES	{ St. John's Vicarage, Isleworth, Middlesex, England.
Mr. JACOB STOUT	{ 100 E. 17th St., New York, N. Y.
Prof. W. H. VON STREERUWITZ	P. O. Box 465, Austin, Texas.
Prof. I. STRINGHAM, Ph. D.	Berkeley, Cal.
Hon. DEMAS STRONG	71 Broadway, Brooklyn, N. Y.
Mr. GEORGE H. STRONG	220 Market St., S. F., Cal.
Miss HENRIETTA STRONG	{ "The Virginia," Rush St., Chi- cago, Ill.
Mrs. WILLIAM EMERSON STRONG	{ "The Virginia," Rush St., Chi- cago, Ill.
Prof. J. W. STUMP	24 Montcalm St., Oswego, N. Y.
Miss MARY A. SULLIVAN	571 36th St., Oakland, Cal.
Dr. M. J. SULLIVAN	30 Post St., S. F. Cal.
Mr. DANIEL SUTER	235 Kearny St., S. F., Cal.
Hon. A. SUTRO*	{ 30 Montgomery Block, S. F., Cal.
Mr. H. C. SWAIN	1107 Post St., S. F., Cal.
Prof. WM. SYMMONDS	Santa Rosa, Cal.
Miss ABBY TAFT	Box 45, College Park, Cal.
Mr. C. F. A. TALBOT	204 California St., S. F., Cal.
Mr. C. L. TAYLOR	709 Bush St., S. F., Cal.
Prof. J. M. TAYLOR	State University, Seattle, Wash.
Dr. JESÚS MUÑOZ TÉBAR	Carácas, Venezuela, S. A.
Mr. JOHN TEBBUTT	{ Observatory, Windsor, New South Wales.
Mr. I. E. THAYER	204 Front St., S. F., Cal.
Dr. JOHN M. THOME*	{ National Observatory, Cordo- ba, Argentine Republic.
Mr. C. W. TIEDEMANN	312 Sixth St., S. F., Cal.
Mr. AURELIUS TODD	Eugene, Oregon.
Mr. FREDERICK C. TORREV	230 Post St., S. F., Cal.

Hon. J. W. TOWNER	Santa Ana, Orange Co., Cal.
Mr. S. D. TOWNLEY	{ Astronomical Observat'y, Ann Arbor, Michigan.
Mr. J. P. TREANOR . . . . .	. 320 Sansome St., S. F., Cal.
Prof. C. W. TREAT . . . . .	. Observatory, Napa, Cal.
Hon. ALFRED L. TUBBS* . . . . .	. 611 Front St., S. F., Cal.
Mr. R. H. TUCKER, JR.	{ LICK Observatory, Mt. Hamilton, Cal.
Mr. HENRY J. TURNER*	{ Woodville, Rappahannock Co., Virginia.
Miss M. J. TURNER . . . . .	. 11 Faxon Ave., Quincy, Mass.
Prof. L. W. UNDERWOOD	{ UNDERWOOD Observatory, Appleton, Wisconsin.
Miss SARA CARR UPTON	{ 2109 Pennsylvania Ave., Washington, D. C.
Señor FRANCISCO VALIENTE . . . . .	. San José, Costa Rica.
Mr. FELIPE VALLE	{ National Observatory, Tacubaya, Mexico.
Mr. J. M. VAN SLYKE	{ 29 S. Pinckney St., Madison, Wisconsin.
Dr. M. A. VEEDER . . . . .	. Lyons, New York.
Rev. P. V. VEEDER, D. D. . . . .	. Berkeley, Cal.
Mr. RUDOLPH E. VOIGT . . . . .	. 207 California St., S. F., Cal.
Rev. JACOB VOORSANGER . . . . .	. 2316 California St., S. F., Cal.
Mr. JOSEPH B. WALKER	{ Sampson & Hendricks Building, Austin, Texas.
Mr. FREDERIC LUMB WANKLYN	{ 241 Drummond St., Montreal, Canada.
Mr. J. W. WARD	{ 271 Bourke Street, Sydney, New South Wales.
Mr. W. R. WARNER	{ Care of Warner & Swasey, East Prospect St., Cleveland, Ohio.
Mrs. W. SEWARD WEBB	{ 680 5th Avenue, New York, N. Y.
Prof. L. WEINEK	{ Imperial Observatory, Prague, Austro-Hungary.
Prof. L. G. WELD	{ State University, Iowa City, Iowa.
President ANDREW D. WHITE* . . . . .	. Ithaca, N. Y.
Mr. E. J. WHITE	{ Observatory, Melbourne, Victoria.
Mrs. E. M. WHITE . . . . .	. Framingham, Massachusetts.
Mr. FREDERICK H. WHITWORTH . . . . .	. Seattle, Washington.
Mr. A. STANLEY WILLIAMS	{ Bella Vista, Hove Park Villas, West Brighton, England.
Rev. E. F. WILLIAMS, D. D.	{ 4545 Drexel Boulevard, Chicago, Ill.
Mrs. MARY H. WILLMARTH* . . . . .	. 222 Michigan Ave., Chicago, Ill.
Mr. JAMES A. WILSON . . . . .	. 1321 Steiner St., S. F., Cal.
Mr. J. HOWARD WILSON . . . . .	. 753 Carroll St., Brooklyn, N. Y.
Mr. WILLIAM C. WINLOCK	{ Smithsonian Institution, Washington, D. C.

Colonel B. WITKOVSKY*	{ St. Petersburg, Petersburg Side, Great Prospect h. 8, l. 5, Russia.
Mrs. RICHARD WOOD	243 Ridge Ave., Allegheny, Pa.
Mr. CHARLES G. YALE	{ Statistician U. S. Mint, S. F., Cal.
Mr. EDWARD B. YOUNG	430 Montgomery St., S. F., Cal.
Mr. FREDERICK W. ZEILE*	308 Market St., S. F., Cal.
Prof. C. V. ZENGER	Smichow, Prague, Bohemia.
Mr. F. R. ZIEL	410 California St., S. F., Cal.